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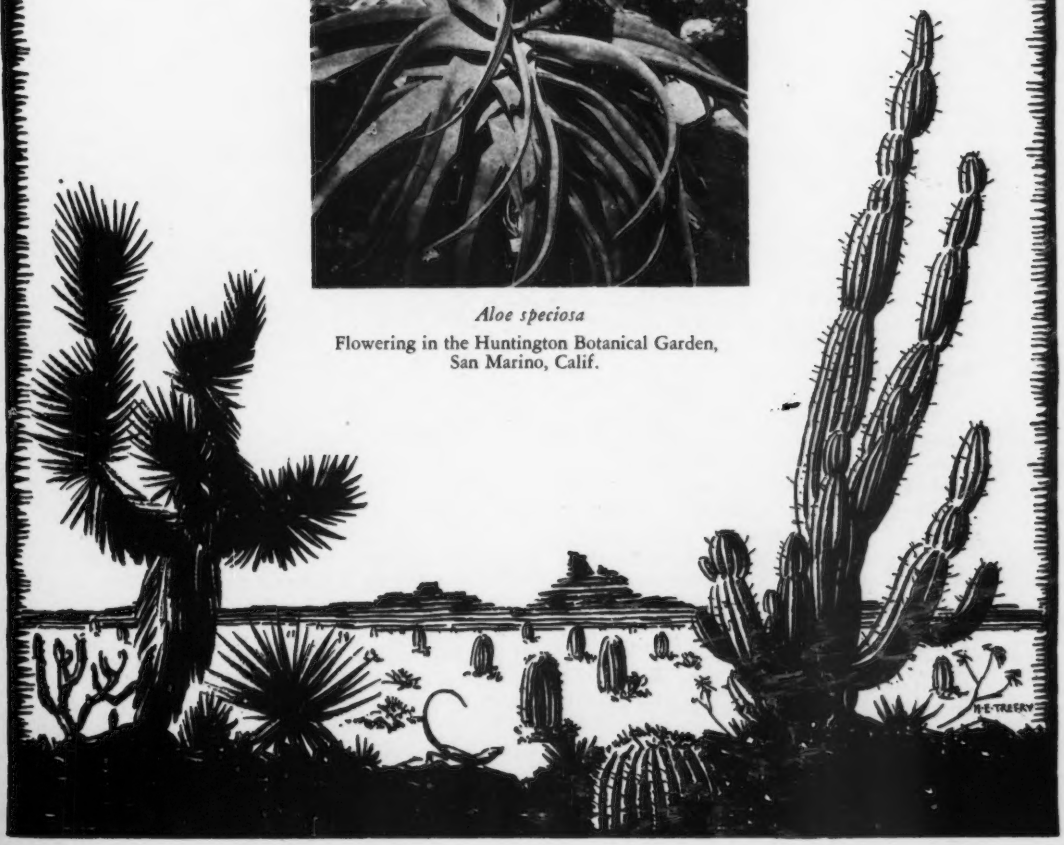
CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society Of America

Vol. VIII MARCH, 1937 No. 9

Aloe speciosa

Flowering in the Huntington Botanical Garden, San Marino, Calif.



CACTUS AND SUCCULENT JOURNAL

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ALOES

Aloe speciosa (see front cover) is one of the most beautiful of the South African succulents. Its showy, torchlike flowers are set in a dense rosette of grayish-green leaves. The buds are a rich rose pink and the flowers, when opened, are a greenish white.

In their native environment, the plants grow at an elevation of about 2,500 feet and are found over a large area. They become naturalized easily in California. Here they grow to an average height of fifteen feet, but this growth is achieved slowly. *Aloe speciosa*, in common with many other aloes, likes full sun or semishade, and will thrive without much irrigation. It will respond, however, to rich soil and additional moisture.

The aloes of this species in the Huntington Botanical Gardens were grown from seed imported from South Africa. The youngest specimens are now five years old and are coming into bloom for the first time. They give promise of being the most spectacular of the aloes in the entire collection. As their blooming period extends through January, February, and March—a season when other colorful flowers are lacking—they should become popular in California gardens.

WM. HERTRICH, *Curator.*

GARDEN CLUB NOTICE

The spring meeting of the California Garden Clubs, Inc., which will be held at Laguna Beach, April 9th, 10th, and 11th.

BRITTON AND ROSE REPRINT

March 31st will terminate the introductory offer made to members of the CACTUS AND SUCCULENT SOCIETY. After that date, no further orders can be accepted for completing Edition A as reprinted in the JOURNAL. If you wish to complete your CACTACEAE, mail your sections at once and write your own terms if you so desire. Volumes I and II (both editions) go to the bindery on the last day of the month, which is ahead of schedule. These two volumes will be shipped as soon as bound while the last two volumes are being completed. Foreign orders will be accepted after this date as well as those who replied to the questionnaire or those who have special requests under consideration.

Officers of the San Fernando Valley Cactus and Succulent Society are as follows:

President, Mr. Richard Williams; *Vice-President*, Mr. Wm. T. Turner, *Secretary-Treasurer*, Mrs. Grace L. Turner; *Executive Board*, Mr. O. H. Daugherty.

Officers of the Midwest Cactus and Succulent Society are as follows:

President, Mr. John E. C. Rodgers; *Vice-President*, Walter A. Rutter; *Secretary-Treasurer*, Mrs. Joseph C. Trapp.

FROM A DALLAS PAPER

DALLAS, Tex., Feb. 10 (U.P.)—Cactus plants today replaced flowers around the hall of records after the county building superintendent complained that loafers destroyed the flowers by sitting on them.

Cochemeia maritima Lindsay sp. nov. x 0.5

A New Cochemeia

By GEORGE LINDSAY, Lakeside, Calif.

Caespitose, the clusters to 1 meter in diameter, often 5 dm. high; roots thickened to 2½ cm. in diameter, somewhat jointed, corky in texture and making hair roots from joints and from base of thickened portion, also making roots from branches nearest the ground; stems erect, procumbent or trailing with ascending tips, 3 to 7 cm. in diameter, blue green, glaucous, tuberculate; tubercles sub-conic, somewhat flattened laterally, becoming gray and corky in age; areoles circular, bearing gray wool when young, naked in age; axils of young tubercles from which flowers arise also bear gray wool; radial spines 10 to 15, reddish brown, acicular, about 1 cm. long; central spines 4, reddish brown, acicular, the 3 upper ascending, 1 to 2 cm. long, straight, the lower one porrect, hooked, 2 to 5 cm. long; flowers from axils of tubercles near top of plant, 3 cm. long, scarlet, cylindrical-trumpet shaped, the sides only slightly sloping; flower parts all colored, in 3 series, the intermediate one about half way up, upper segments flaring and reflexed, lower ones erect and applied to tube, middle ones intermediate between the two in shape; style exserted nearly as long as the corolla ,the pistil and single stigma-lobe scarlet; stamens erect, about half as long as the exserted style, the filaments and anthers red; fruit globose, somewhat umbillicate, red, juicy; seeds black, minute, ½ mm., slightly pitted.

Type locality: Punta Blanca, Baja California, Mexico.

Distribution: limited to the type locality as far as known.

Type specimen deposited in Dudley Herbarium, Stanford University, Stanford, California.

Cochemeia maritima Lindsay. Species nova.

Racemi diametro 1m saepe 5 dm. altitudine, radices densi 2½ cm. diametro, corticei textu; trunci erecti, trahentes 3-7 cm. diametro; tubera sub turbinea paulo complanata transversa; aculeis marginalibus 10-15; rubris—fascis similibus acus ca longitudine 1 cm; aculeis centralibus 4, rubris fuscis similibus acus, tres superiores ascendentes, 1-2 cm. longitudine, inferior porrectus hematus longitudine 2-5 cm; flores ex axibus tuberum prope summum plantae longitudine 3 cm., coccini cylindri—tubae forma, latera modo paulum declivia; partes florum omnes colore imbuti tribus ordinibus; stylus protrusus tam longus quam corolla; pistillum et singulis stigmatibus—lobus coccinum; stamina erecta, dimidio quam exertus stylus fibrae et anthera rubra; fructus globosus nonnihil umbilicus, coccinus, succiplenus; semina atra, mininia, ½ mm, scrobiculatia paulo.

Genus—Locus. Punta Blanca, Baja California, Mexico.

Distributio: Cognita sola in loco praescripto.

Flower of *Cochemeia maritima* sp. nov.

A NEW COCHEMIA

While on a collecting trip into Lower California in 1935, I met a native at Punta Prieta who told me he had noticed a small "chollita" bearing edible fruits growing on the coast west of that village. His rather vague description of the plant led me to believe that it might be a new *Neomammillaria,* or possibly *Cochemia pondii.*

Arrangements were soon completed for a guide and burros in order to visit the spot. We arrived at isolated Punta Blanca the next evening. The first plant of this species to be observed was a huge clump, nearly a meter in diameter, and half that high. It was found growing in a sandy flat about one hundred yards from the ocean. The plants were much more numerous, though not so large, on the cliffs just over the water. The plants varied much, both in size, and in length of spines, some apparently mature specimens being only two or three inches high. No single headed specimens were observed.

Three flowers were found, and the flower description is based on sketches made from these at the type locality. Five or six fruits developed on the plants brought back, and while these were not as large as the guide had described them as being, they were never the less mature, as seed from them germinated. The imported plants are doing well, but failed to flower last Spring.

The plants were found only at the type locality. It is decidedly a maritime species; at no place was it found growing more than three hundred yards from the ocean.

The plants were growing in association with *Yucca valida, Agave shawii, Neomammillaria blossfeldiana,* a little plant which may prove to be *Neomammillaria dawsonii,* and several Opuntias.

NOTES FROM MEXICO

By TED HUTCHISON

EDITOR'S NOTE: *These hasty notes are not up to our Past Secretary's literary style, but are presented as received—and with the usual envy of anyone exploring new fields.*

About 70 miles below the border (Nuevo Laredo, Tamaulipas) we (Mr. Richard G. Atkinson and myself) turned off at Sabinas and went through a canyon to Villaldama and on a ways where we stayed all night. In the morning we scouted around and found *Coryphantha nichelsae* and one similar to *pallida, Ancistrocactus scheeri, Wilcoxia poselgeri, Homalocephala texensis, Neomammillaria heyderi* and various *Opuntias.*

After a campfire breakfast we pushed on to Bustamante and at the entrance to a canyon to the west of that village we ran into an *Echinocereus* and possibly an *Escobaria.* Further in the canyon we came across a lovely *Echeveria*-like plant with even more high coloring than *Byrnesia weinbergi* and an *Escobaria* (?) with a few long hairs at the top of the plant. This latter is variable in color and Miss Helia Bravo is endeavoring to classify it. Further up the canyon we found two more of the same plants yet almost white.

After proceeding up the canyon a ways, where *Caladiums* were growing wild, we saw some *Echeverias* growing on a cliff with a N. E. exposure. We stopped at once and, on climbing the bank, were almost slapped in the face with clusters of *Neomammillaria plumosa* 8 to 12 inches in diameter and a little, interesting succulent in the rock crevices. The *Echeveria* which stopped us is similar to *E. elegans,* but larger and with slightly crenate margins.

LEFT: Meet Mrs. Neff Bakkers, who is one of the best known members of the CACTUS SOCIETY. Operating Knickerbocker Nursery, Mrs. Bakkers has made a host of friends. RIGHT: Ted Hutchison "posing" in the Knickerbocker Nursery, San Diego.

After getting the plants we wanted and after breaking a hook in a nearby stream we settled down to a dignified lunch of minced meat, *pan dulce* and tomatoes, canned.

Lunch over we went around the point to a more westerly slope and again went up. Seeing what I thought to be a *Ferocactus hamatacanthus*, I nearly fell down the mountain side as I found myself face to face with *Astrophytum capricorne*, and then the hunt began. There were very nice *Epithelanthas* there, too.

Altogether in that one spot we found the above mentioned plants beginning with *Neomammillaria plumosa* and the following: *Agave, Hechtia, Tillandsia, Opuntia* of three types, *Neomammillaria heyderi* and two *Echinocereus*.

We did no more collecting for two days until we got into the tropics and got *Selenicereus spinulosus, Hylocereus undatus, Rhipsalis casutha, Cephalocereus palmeria, Lemaireocereus pruinosus* (?) and two other *Selenicereus*.

After arriving in Mexico City I contacted Miss Helia Bravo, who offered to do all she could to facilitate our collecting and to whom we shall be very indebted for much aid in classification and pointers for collecting.

Thursday we left Mexico for Puebla, and on the way, at an altitude between 8,000 and 7,000 feet we collected a very fine *Tillandsia*.

Friday we pulled out of Puebla for Jalapa and here, on ascending the grade out of the Puebla Valley, we collected a nice flattish *Neomammillaria* with yellow, brown spines. Later we saw a cluster about 18 inches through.

Up to this time we had been pursued by cloudy weather, but here I took my first picture. We also saw *Opuntia truncata* with black spine sheath tips and beautiful plants of *Cephalocereus sartorianus, Lem. treleasei* (?) and *L. pruinosus;* a yellow, cylindric *Neomammillaria;* various *Selenicereus*, one of pencil thickness and with very soft spines; *Desmia testudo* (?) and a *Hylocereus* as well as numerous Orchids and what a great many tropical plants. Don't let anybody tell you the tropics are warm.

Cerro de los Almohadones (Bolster Hill) Quebrada del Toro, Mendoza, Western Argentina. Altitude about 6,000 feet at base. Typical landscape, northwestern exposure. The forest of cacti evtends to the top of the mountain; elevation 10,000 or 11,000 feet.

LOBIVIA FORMOSA (Pfeiffer) NEW COMBINATION

THE BOLSTER CACTUS OF THE QUEBRADA DEL TORO, MENDOZA, WESTERN ARGENTINA

By DR. LIONEL DODDS

(Edited by E. M. Baxter)

Lobivia formosa, n. comb.

Echinocactus formosus Pfeiffer Enumer. cact. 1847.
Echinopsis formosa Jacobi Salm Dyck. Cact. Hort. 1849.
Lobivia oreopepon Spegazzina Anal. Soc. Cien. Arg. 1925, Vol. 99.
Acanthocalycium formosum Backeberg in Kaktus ABC. 1935. Backeberg & Knuth.
Acanthocalycium oreopogon Backeberg in Kaktus ABC. 1935. Backeberg & Knuth.

Argentina Federal Highway No. 7, Buenos Aires to Chile, via Uspallata, taps the Quebrada del Tora, the Bull's Canyon, 50 miles west of Mendoza at an elevation of 6,000 feet. It steadily climbs for fifteen miles along the dry riverbed, to reach the Paramillo, a lofty desert plain, at an altitude of 12,00 feet. The mountains, especially those with a northwestern exposure, are covered with a forest of tall cylindrical cacti, remarkable for their size and shape and that at a distance look like so many bolsters, or long, round pillows, standing on end.

DESCRIPTION OF THE PLANT

I have been able to distinguish three forms of this cactus:

(a) A tall columnar cactus; solitary, simple or branched; small bare areoles; white flexible spines; acute grooves between the ribs; grayish green.

(b) A polycephalic cactus; a cluster of many heads joined together only at the base; small areoles; white flexible spines; acute grooves; gray green.

(c) A much heavier cylindrical unbranched cactus; large areoles; stout yellow spines with brown tips; wide obtuse grooves; bright green.

Size: variable according to age; some of the older plants may reach 9 or 10 feet in height and 12 to 18 inches in diameter.

Ribs: 35 to 60 or more, according to size of plant.

Areoles: elliptic, alternating, with soft felt when young, bare when aged.

Spines: 15 to 20; central spines from 2 to 5, long, straight; radial spines 15 to 20, shorter.

Flowers: Diurnal, appear at the end of Spring or beginning of Summer from the younger areoles near the top of stem; funnelform; about 2½ in. long by 1½ in. wide; green without; flower tube and ovary bearing numerous scales with long appressed hairs from their axils; inner perianth segments golden yellow, mucronate, chartaceous dark brown tips; stamens numerous; style cylindrical, white, longer than the filaments; fruit unknown to me.

Locality: The Quebrada del Toro, Cordillera de los Andes, Mendoza, Western Argentina.

Distribution: According to Carette and Ruiz, of the Mendoza Natural History Museum (La Libertad, Mendoza, June 12, 1936) whose explorations have covered a period of ten years, this species is found in the Pre-cordillera, from the northern boundary of the State to the Cerro Nevado, San Rafael, in the south; always at an elevation of more than 5,000 feet.

Renato Sanzín (Revista Chilena de Historia Natural, 1921. Vol. 25; page 97) states that it occurs in the Pre-cordillera without referring to any particular place.

Spegazzini (Nuevas Notas Cactologicas; Anales de la Sociedad Scientífica Argentina; Vol. 99, page 125) referring to this, or perhaps another species, describes a cactus found in the vicinity of Cacheuta, 25 miles southwest of Mendoza, at an elevation of 4,000 feet.

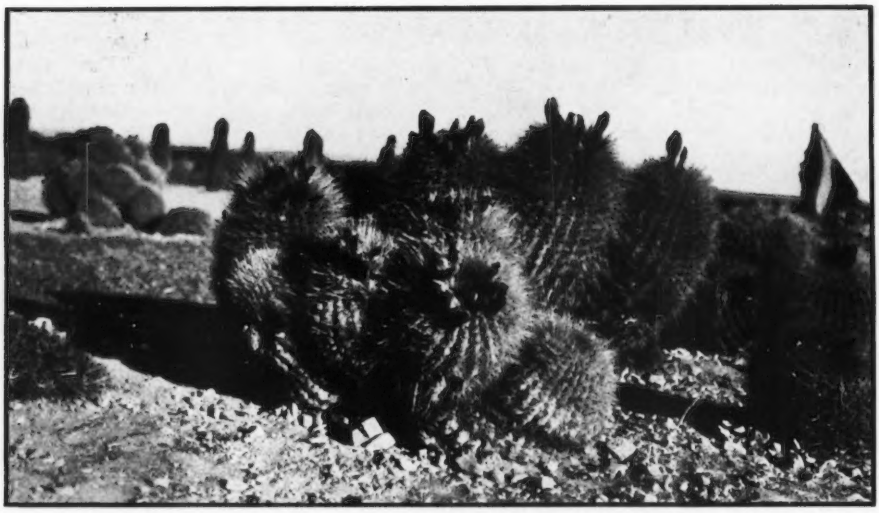
My personal experience (Los Andes, Mendoza, April 26, 1936) is that this tall bolster cactus grows only in the Quebrada del Toro and its vicinity always at an elevation over 5,000 feet.

Growth: This species grows slowly. H. J. Elwes (The Cactaceae, Vol. 3; page 75, under *Echinopsis formosa*) states "There is a species in the Darrah collection at Manchester that is 2 feet high. It has added but one inch to its height in the last 10 years. The specimen has been in England for 60 years." In 1932, plants of various sizes were taken from the Quebrada del Toro and transplanted in my garden. I have been able to follow the growth of one particular specimen. When transplanted it was only 4 inches high and had 4 or 5 areoles on each rib; for three seasons it seemed to remain stationary, whilst it developed the root system that is to be such a vital part of its mechanism for meeting the uncertainties of life. In the two following years it has added 10 inches to its height and 8 or 9 areoles to each rib. Although it bloomed the first year, because the flower buds were already formed, it failed to do so afterwards ,as usually happens when these plant are removed from their native habitat; this year it produced eleven beautiful golden blooms.

DISCUSSION

Strange as it may appear, this remarkable cactus is not described, illustrated, nor even mentioned in The Cactaceae, Britton & Rose. Our greatest Argentina authority, Dr. Carlos Spegazzini, says nothing about the large columnar species in his Cactacearum Platensium Tentamen, Anales del Museo Nacional, Vol. XI, pages 477-521, 1905; nor in his Nuevas Notas Cactologicas, 1925; although in the latter, he describes and shows the picture of the *Lobivia oreopepon*.[1] In Las Cactaceas de Mendoza, Revista Chilena de Historia Natural, Vol. 25, 1921, Prof. Sanzin of the Mendoza College of Agriculture published the picture of a cactus found in the Quebrada Empozada, 15 miles west of the city, at an elevation of 6,000 feet, accompanied by the following commentary, "A beautiful cactus that I was unable to classify and that is probably a new species is quite common in the Pre-cordillera. On account of its size and shape it resembles the *Pilocereus erythrocepthalus;* it differs though on account of its yellow flowers and seems to be more like a cereus." The *Pilocereus erythrocephalus*,[2] cited by Sanzin, is no other than the

1. *Lobivia* anagram of Bolivia, *oreus*—mountain; *pepon*—melon, or the mountain melon.
2. From *pilo*—hairy; *cereus*—candle; *erytho*—red; *cephalus*—head or the hairy candle cactus with a red head.



Lobivia formosa n. comb. or the "Polycephalic" variety showing clearly the buds.

Denmoza rhodacantha[3] of Britton & Rose. According to Carette and Ruiz, (op. at) this cactus was described by Pfeiffer, in 1837, under the title of *Echinocactus formosus.* This species was already known to English gardeners by the name of *Melocactus gilliesii. Echinocactus gilliesii* and *Echinopsis formosa gilliesii* are usually referred to *Echinopsis formosa;* THE CACTACEAE, Britton & Rose, Vol. 3, page 75.

Not much is known about Dr. Gillies. He was unmarried; a brilliant scholar, who probably came to the Rio de la Plata with the British Expeditions of Beresford in 1806 or Whitelock in 1807. He settled in Mendoza where he practised medicine and contributed extensively to our knowledge of the indigenous flora.

Harry Blossfeld is a young German University student, a horticulturist of no mean calibre and a specialist in cacti. The interesting report of his cactus collecting expedition in South America, translated by Mrs. Vera Higgins, was published in the CACTUS AND SUCCULENT JOURNAL VOL. VII., NO. 10, APRIL, 1936. During his short stay in Mendoza, on his return to Buenos Aires from the Pacific coast, he honored me with a visit. He told me that the tall cylindrical cactus he had seen in the Quebrada del Toro was similar to a species that grows on the highlands of Bolivia, called "poco" by the inhabitants.

THE CACTUS AND SUCCULENT JOURNAL, VOL. VI, PAGE 100, JANUARY, 1935, published a collection of photos of Bolivian cacti arranged by R. W. Kelly. No. 1 "*Trichocereus poco* growing at an elevation of 12,000 feet. The plant is 9 feet high, has yellow spines and yellow flowers." No. 2 is a close-up of the same plant. Mr. Kelly has made the same mistake that I did in the same Journal in Vol. VII, July, 1935. My photos 1, 2, and 3, "a *Trichocereus* with yellow flowers, not mentioned in Britton & Rose." These cacti are not *Trichocerei.* The flowers of this genus are never yellow; they are white and much longer than those shown in the pictures. It is my belief that these plants belong to the genus *Lobivia,* created by Britton & Rose. Mr. Kelly's pictures refer to *Lobivia poco;* mine to some other species; because although they appear to have similar characteristics, they differ in the color of the spines and in the size of the flower.

Acanthocalycium is a new genus created by Backeberg (Backeberg & Knuth, KAKTUS ABC, 1935, page 224). The generic name is from Greek "Akantha, meaning a thorn; Kalyx—a bud;" referring to the spiny flower. Nine species that were formerly grouped among the *Lobivias* belong to the new genus that differs from *Lobivia* in that the flower tube and the ovary are covered with scales, each with a reflexed cartilaginous somewhat pungent apex; the flowers are 2 to 2½ in. long; the outer perianth segments and often the inner have acuminate or mucronate chartaceous tips.

3. From *Denmoza*—anagram of Mendoza; *rhoda*—red; *cantha*—spines.

Three divisions are established:

(a) flowers yellow; tube naked within.
(b) flowers white or red with a ring of dense brown hairs near the base within the tube.
(c) flowers yellow; with a ring of dense brown hairs near the base within the perianth tube.

Two species interest us, both belonging to group "a".

1. *Acanthocalycium formosum* Backbg.

Echinopsis formosa Jacobi.
Echinocactus formosus Pfeiffer.

Taken from MONOGRAPHIA CACTACEARUM Schumann, 1903: "Stem simple, at first elliptic, afterwards columnar, somewhat depressed at the apex; 50 cm. high by 15 to 17 cm. in diameter; grayish green; ribs, 19 to 22; linear; obtuse; areoles 2 cm. apart, obovate, covered at first with yellow wool which later turns gray; radial spines 11 to 13; 4 cm. long, stout and slightly curved; central spines 6 to 8; reddish and slightly longer; flowers funnelform, 8 cm. long, inner perianth segments of a bright golden yellow, the ovary and tube being covered with hairy scales.

2. *Acanthocalycium oreopogon.* Bckbg, 1935;
Lobivia oreopepon — Spegazzina. Nuevas Notas Catologicas. Anales de la Sociedad Científica Argentina; Vol. XCIX, 1925.
"Stem subglobose, slightly depressed; glaucous green; ribs 18 to 20; areoles 2 cm. apart, covered with yellow wool that on ageing becomes gray; radial spines 15 to 18, gray with brown tips; central spines 2 to 4, longer and stouter; flowers from the younger areoles near top of stem; outer perianth segments green; inner segments yellow, mucronate with stout chartaceous brown tips; scales on ovary and tube with long appressed hairs."

The species described by us fits the classification of:

Britton & Rose

Lobivia

A. Flower tube naked within.
B. Ribs 20 to 50 or more.

Backeberg & Knuth

Acanthocalycium

A. Flowers yellow.
B. Tube naked within.

How is it that such an outstanding cactus escaped the notice of Dr. Rose who, accompanied

Flower of *Lobivia formosa* n. comb. showing the mucronate chartaceous tips of the perianth segments.

by Paul G. Russell, visited the deserts about Mendoza in 1915; and Dr. J. A. Shafer, whose collection of cacti and field observations during a six months exploration of the deserts of northwestern Argentina in 1916, yielded such important information for the preparation of THE CACTACEAE? It is stated by Britton & Rose (Vol. 3, page 75) referring to *Echinopsis formosa.* "We know the species only from descriptions and some very poor illustrations." How is it that Carlos Spegazzini, who knew this country so well, did not describe the bolster form of this cactus?

Now it is my belief that this particular cactus *only* occurs in the Quebrada del Toro, Federal Route No. 7, at an elevation of over 6,000 feet; particularly on one of the mountains with a northwestern exposure, that I have named El Cerro de los Almohadones "Bolster Hill" because at a distance these tall cylindrical cacti look like so many cushions standing on end.

Before the Highway was constructed the Quebrada was practically inaccessible. To get there meant a long day's journey either on horse or mule, across an arid desert, with no water for their steaming autos. Darwin used this route, known as "the old road to Chile" (the new one passed through Villavicencio). He and other scientists must have seen these huge plants, some of which weigh nearly a ton, but they have left no written records, probably because they were mistaken for the larger forms of *Denmoza rhodacantha,* to be found growing in such quantities on the lower hills nearer to the city of Mendoza.

Are we in the presence of a new species? I believe not. Although Backeberg and Knuth describe *Acanthocalycium formosum* and *Acanthocalycium oreopogon* as two different species, it appears to me at present that these two, together with my bolster cactus, are merely forms of the cactus known to Dr. Gillies over a century ago, of the species described by Schumann, of Sanzin's cactus in the Empozada Canyon, and of Spegazzini's *Lobivia oreopepon.*

In botany a *form* is a variation from the species usually of an impermanent character. Plants are largely affected by environment. The smaller forms of this cactus occur at an elevation of not less than 3,000 feet; they increase in size and weight with the altitude, the largest plant occurring at a height of 10,000 to 12,000 feet.

The last word on cacti has not been written. I am just an amateur fancier, encouraged by Dr. A. D. Houghton, so well known to readers of the JOURNAL. He says in THE CACTUS BOOK, "A perusal of THE CACTACEAE shows how much of it was made possible by collections of amateur fanciers.*** Not withstanding the enormous collection of facts and material, the number of incomplete descriptions as well as the number of unrecognized species is large.*** One reason for presenting THE CACTUS BOOK is that it may encourage amateurs so that more material may be available for study by trained taxonomists in the publication of newer and fuller works on this subject."

Illustrations in Crassulaceae

By ERIC WALTHER, Botanist Golden Gate Park

Villadia cucullata Rose.
Villadia painteri Rose.

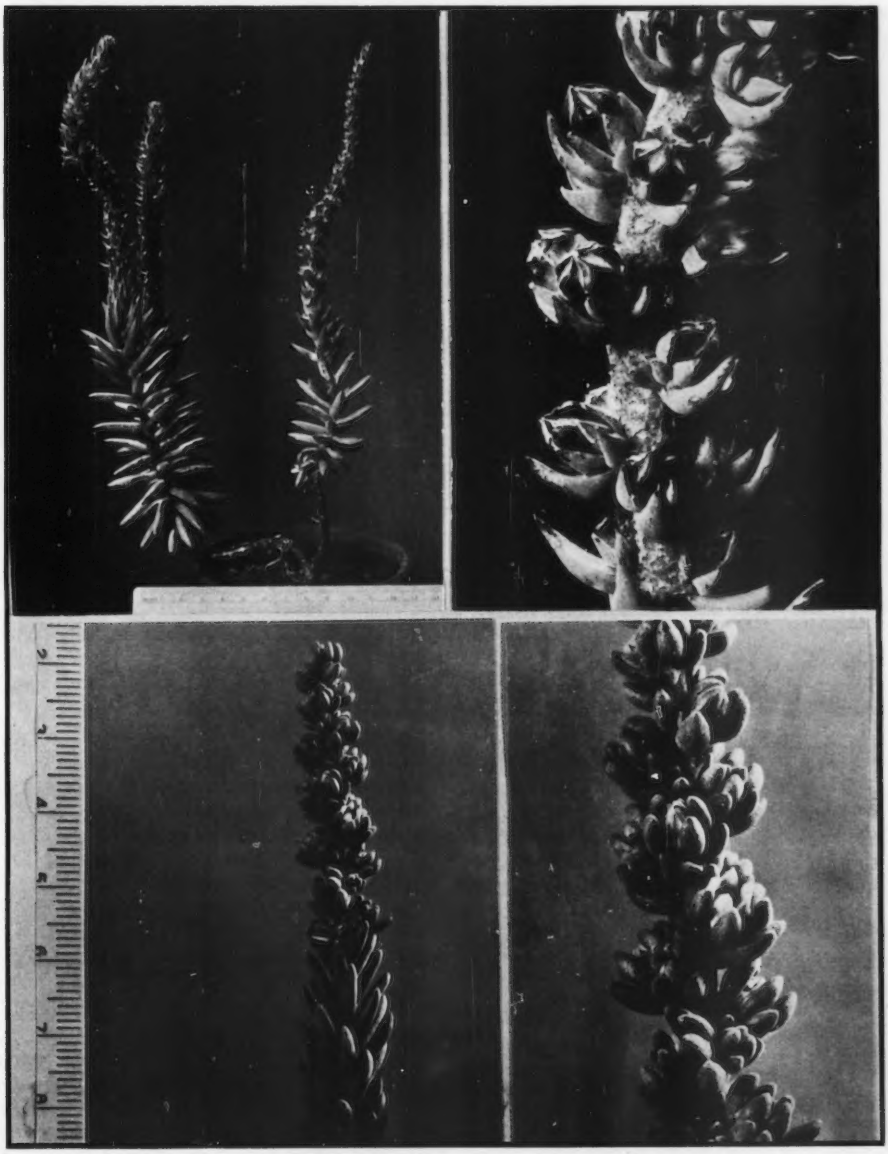
During the writers studies in *Echeveria* an effort was made to arrive at a clear view of its generic limitations and position. Particularly interesting were those closely allied genera such as *Villadia,* for instance, of which we collected living plants belonging to two species on our last trip to Mexico. Photographs No. 1 and 2, respectively, are of *Villadia cucullata* Rose, gathered by us in 1935 on the slopes of the "Cerro de Tathi," near Zimapan. The location was one of the hottest and driest we met with; and the plants grew in nearly full sun, in dry, rocky-clay soil, in company with typical xerophytic plants as *Mimosa* sp., *Agave stricta, Ferocactus* sp., *Yucca* sp., *Dasylirion* sp., also *Hunnemannia fumariaefolia,* the Mexican bush-poppy.

Our picture, of a plant flowering in the collection of Golden Gate Park, S. F., clearly shows the subulate leaves, the terminal, equilateral inflorescence as well as the peculiarly hooded petals. The latter in fact never really open, but remain hooded above the pistils and stamens, whence the name, or at most, merely gape apart slightly at their edges.

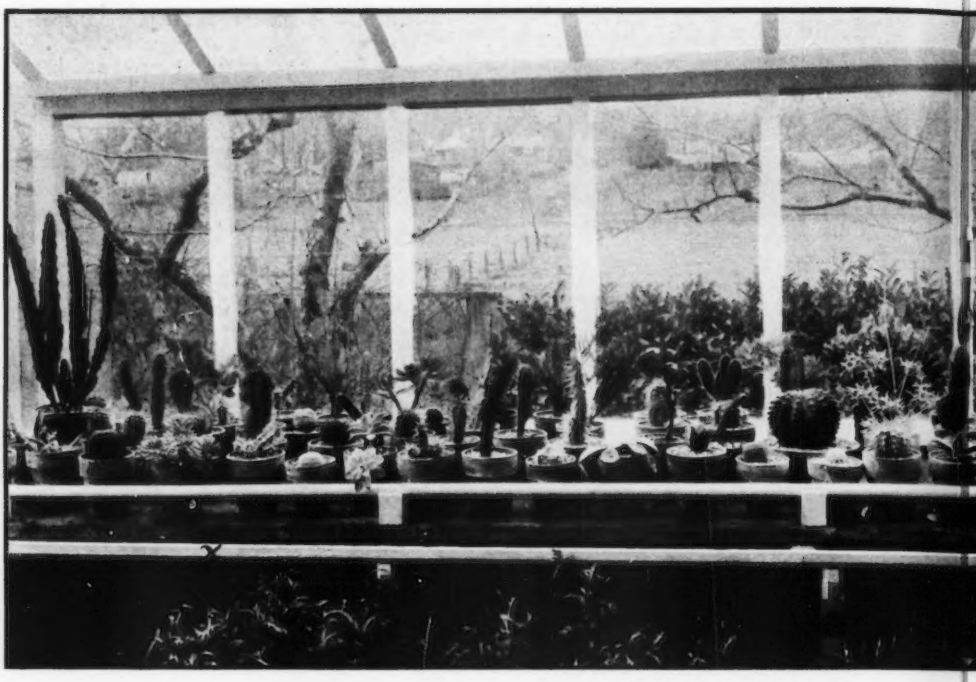
In cultivation the plants proved susceptible to attack by greenhouse-leaf-tier (*Phlyctaenia ferrugalis* Hbn.) and onion-strips, (*Thrips tabaci* Lind.). Seed gathered yielded numerous seedlings, some of which are now flowering when

still less than one year of age.

The other species here illustrated is *V. painteri,* the photograph being of a plant in the Park-collections, originally collected by us November 1935, in the "Barranca de Oblata" near Guadalajara. It agrees with the previous species in its tuberous rootstock and terete leaves, but differs in its erect petals, blunt leaves and bracts, both of which are minutely papillate, and the very short style.



UPPER LEFT (Fig. 1). *Villadia cucullata* Rose; flowering plant, app. x 0.4
UPPER RIGHT (Fig. 2). *Villadia cucullata* Rose; portion of inflorescence, app. x 2.5
LOWER LEFT (Fig. 3). *Villadia painteri* Rose; flowering plant, app. x 1.3
LOWER RIGHT (Fig. 4). *Villadia painteri* Rose; portion of inflorescence, app. x 3.



A glass-house in Canada. Most of these pla

In regard to your request for photos of glass houses I thought my own might be of interest to my fellow readers. It is 25 feet long and about 8 feet wide; it is a lean-to, built on to our dwelling house. We walk out of our dining room through a French window into it, and there is also a door leading out of the other end which is our front entrance to house. The bench on which the plants stand, is 2 feet, 6 inches wide covered with roofing which drains into a wooden gutter

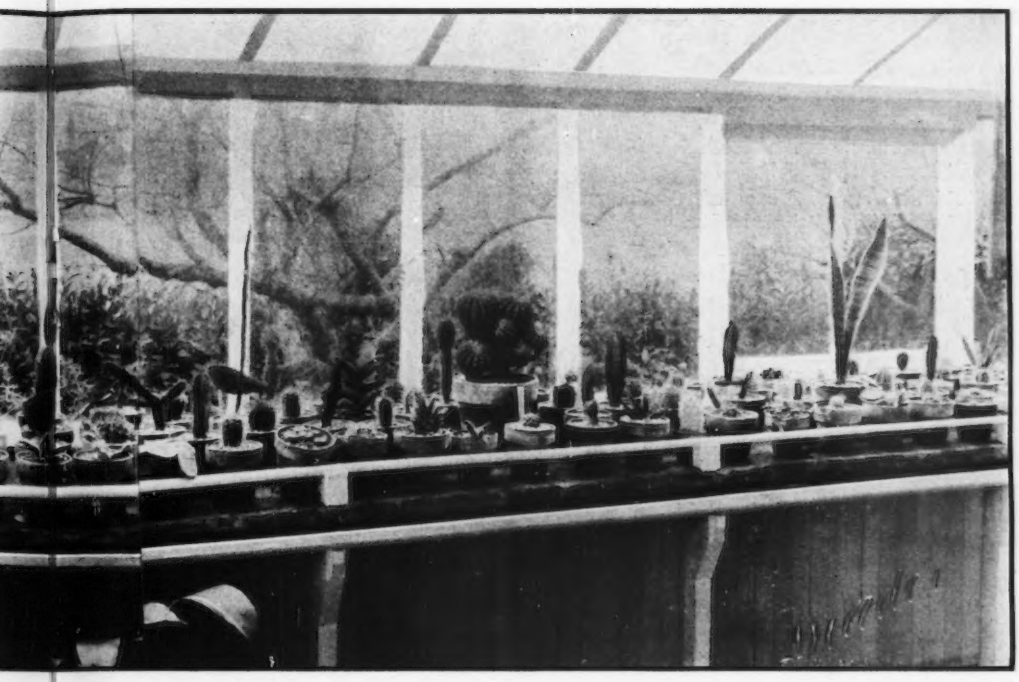
OKLAHOMA NOTES

Our Society has now secured a permanent meeting place in the Auditorium of the State Historical Bldg. Also an invitation to establish a collection of Oklahoma Cactus and Succulents on the grounds of the Historical Bldg.

Oklahoma City is honoring one of its Native Sons, who was a well loved citizen of the whole world, by building a lovely park and giving it his name. "Will Rogers Park." The city is building a large conservatory in this park and has reserved one room for a cactus collection by and under the instruction of our Society. The building was just completed last week, so we are now busy buying, trading, collecting and accepting donations for this collection. They have also given us all the space we desire outdoors in the park for a collection of hardy cacti. These three collections to build up, added to our Cactus Garden at Quanah Parker Dam, in The Wichita National Forest will keep us all very busy this year.

Our study during February was "Soil and Fertilizer for Cacti" and "Pests and Their Control." We feel a little better equipped to handle our plants, both hardy and tender.

I enjoyed Mr. William F. Kimes' article, "This Cactus Hobby" very much. Our year book shows a fifty-fifty men and women membership, many reading Mr. and Mrs. So the hobby grows. His statement of the misleading information by the commercial growers was good, but not all their fault. We in Oklahoma find that many plants described as hard to grow,



hese plants were raised from seed four years ago.

shown in front. A pipe is connected at the end which drains the water to the outside of the house. This arrangement keeps everything perfectly dry and we keep the frost out during the winter with the hot air furnace. I am not quite sure what this house cost as I had other work done at the same time, but I think $200 would cover it. A. FRANCIS. *Editor's Note*: These glass-house pictures and explanatory comments are most interesting. How did you solve the problem?

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seem to find in our Oklahoma climate just what they need to thrive, while plants described as very easy to grow, have a hard struggle here, thus making the growing of each plant an experiment. We find the same thing in our native plants. Our *Echinocereus reichenbachii* must have their lime, while our *E. purpurius* prefers a gypsum clay. If Mr. Kimes has soil that would make good adobe brick he should try our *E. purpurius*. That kind of soil is where it is found growing.

MRS. JAMES H. HYDE.

Meetings as scheduled by the Oklahoma Society show a variety of subjects that might help other Societies with their programs.

January 27: "Ariocarpus," Mrs. Marjorie H. Lee.

January 21: "Desirable Opuntias," Mrs. S. P. Sella.

February 4: "Soils and Fertilizers for Cacti," Mrs. W. E. Smeltzer.

February 18: "Pests and Their Control," Mrs. Jas. H. Hyde.

March 4: "Cactus Grafting," Dr. G. L. Berry.

March 18: "Round Table Discussion," Mr. Geo. W. Kline.

April 1: "Care and Acclimation of New Plants," Mrs. Winnie E. Jones.

April 15: "Astrophytum," Mrs. R. A. Chubb.

May 6: "Biography of Some Prominent Cactus Fancier," Mrs. Jesse Vandenburgh.

May 20: "Native Oklahoma Cacti," Mrs. Marion S. Lahman.

June 3: "Lecture," Mrs. R. A. Searle.

June 17: "Native Oklahoma Succulents Other Than Cacti," Mr. Henry Walters.

July 1: "Echinocereanae Group of South American Cacti," Mrs. Harry T. Johnson.

July 15: "Echinocactanae Group of South American Cacti," Mrs. Marjorie H. Lee.

August 5: "Cereus Group of South America," Mrs. Biggers.

August 19: "Round Table Discussion," Mrs. Tom Kelk.

September 2: "Plant Nomenclature Relating to Cacti and Succulents," Dr. G. L. Cross.

September 16: "A German Translation," C. L. Wiese.

October 7: "Cactus as a Hobby," Mr. R. A. Chubb.

October 21: "Mexican Cacti," Mr. Jay E. Gilkey.

November 4: "Desirable Books on Cacti and Succulents," Mr. W. E. Smeltzer.

November 18: "Cactus Gardens in Oklahoma," Mr. A. E. Powers. Motion Picture in Colors.

December 2: "Round Table Discussion," Mrs. J. C. Barnard.

December 16: "Christmas Party," Mrs. Jesse Vandenburgh.

Substitute Lessons: "Reminiscences of Field Trips," Mr. Jas. H. Hyde; "Hardy Cacti for Oklahoma Gardens Other Than Natives," Mr. Harry T. Johnson.

A Monument to a Vandals Orgy

Growing within 100 feet of a seldom traveled road in the Papago Indian Reservation at Sells, Arizona, this *Carnegiea gigantea* has regularly attracted our attention over a period of about six years, yet it never occurred to us until recently that we should stop, photograph and examine the plant.

The answer to the unnatural descent and elephant trunk-like appearance of the main stem was easily explained after close examination. "Homicidal intent with malice aforethought" is what our lawyer members would term it, but fortunately for the conservationist the intent miscarried. Our conclusion was that some vandalistic bent laborer, during the construction of the road, deliberately cut the stem with a sharp tool, undoubtedly an axe, for the hard woody interior ribs show the clean cuts and marks of a sharp

Mutilated *Carnegiea gigantea,* Arizona state flower. *The Opuntia at the point of the fallen stem is the long spined O. macrocentra.*

instrument. The wounds are now healed over and calloused. Indications are that the fall did not happen suddenly, perhaps the vandal tired before his ambitions were reached for those ribs which were not cut, are gracefully bent to allow the stem complete connection with the lower trunk. No doubt the cuts weakened the trunk at the point of attack, which gave the stem a decided lean in the opposite direction, gradually allowing it to lower until the ground was reached. The twist in the ribs verify this opinion and the condition shown in the picture is perhaps the attainment of 20 years growth.

Other branches were all hacked off since it was their misfortune to be tender, but all are now sending out new branches which were in flower at the time of our last visit. The main stem, however, did not have flowers, but seemed to be enjoying a much faster growth than the others, which was probably due to the gravitation advantage gained by its prostrate position.

Not satisfied with man's treachery, a pecking busybody called *Centutus uropygialis* by ornithologists, and just plain woodpecker by the less informed, added his bit to the work by digging two holes in the stem just under the break, yet the plant growed on and on. We are sure that if Andrew Carnegie were alive to witness the fighting spirit of his namesake, he would publicize it throughout the entire world as an example of perseverance.

G. A. FRICK.

Observations on Frost Resistance

By DR. R. W. POINDEXTER

EDITOR'S NOTE: *We have always been aware of more or less envy regarding collections growing in California sunshine. An unusual freeze has a tendency to make us envy our brother collectors of colder climates who are prepared for cold weather. The following observations by Dr. Poindexter will be found most valuable since all collectors are interested in the more hardy species.*

In Southern California the winter of 1936-37 was sufficiently cold to cause the abrupt demise of a number of plants which the optimistic residents of that section had believed safe in exposed situations. Those who are optimistically inclined can look on the other side of the picture and take a considerable amount of pride in those rugged individuals which nobly withstood the attacks of Jack Frost and survived. Those which perished will soon be forgotten, but since similar cold winters will occur from time to time, it appears worth while to make a record of these hardy plants for future reference, and govern our planting accordingly. It is further suggested that some of these plants should be experimented with for outdoor planting in other states having winter temperatures well above zero.

There were many surprises in both directions. Some plants which we had considered hardy succumbed without a struggle, and others which should be tender (considering their native habitat) survived uninjured.

In regard to actual temperatures, I was negligent and did not keep a record. The season was marked by two distinct freezes. The first one was sharp and hard, but observers throughout this region agree that comparatively little actual killing occurred. The second freezing period was prolonged for over a week, and it was this which did the real damage. Far from getting used to being frozen, the resistance of the plants was weakened by the first freeze, and they succumbed during the second period. It was made clear that plants which can withstand a sharp freeze of short duration cannot live through the same temperature when prolonged. The following instances may indicate the amount of cold; water pipes were completely frozen so that no water could be secured, and three heavy brass hydrants were burst by ice. Day after day icicles were hanging from the eaves of my heated glasshouse. One of these which I measured at 11:30 a. m. was then fifteen inches long. The ground was frozen three inches deep and remained without any thawing for three consecutive days and nights in shaded places.

Plants, in general, exhibit a very great degree of variation in frost resistance. The reasons for this are not well understood. Some plants are killed at temperatures well above the freezing point of their juices, while others are uninjured by the actual formation of ice crystals within their tissues. However, certain rules for frost protection are well known from experience. When damaging frosts occur, there is usually a clear sky and little or no wind. A very slight covering from direct radiation to the sky affords protection far greater than might be expected. A single thickness of cloth or paper will often save a plant from damage that would otherwise be severe. A simple expedient is to tie a paper bag over the tender tip of a cactus, taking care that the paper is raised out of actual contact with the tip. I am convinced that a number of cacti and succulents could be raised out-of-doors as far north as Washington, D.C., if covered up for the winter.

CACTI

Perhaps the most satisfactory group of cacti for temperate regions comprises the genera *Echinopsis, Lobivia, Notocactus, Malacocarpus,* and *Rebutia.* They are not only quite cold-resistant, but do not suffer from the combination of cold and moisture which is often fatal to plants able to withstand cold alone. Among a large collection of *Echinopsis* species and hybrids, only four rather rare species were observed to be tender; namely, *E. bridgesii, E. misleyi, E. huottii,* and *E. calochlora.* All *Rebutia* species were hardy, so far as observed. A very extensive *Lobivia* collection cannot be satisfactorily appraised, owing to the immaturity of most of the species. *Lobivia ducis pauli* was definitely tender, also *Lobivia chrysantha.* A number of species proved to be perfectly hardy here and it is probable that nearly all of them would have proved hardy had the mature plants been exposed. All *Notocactus* and *Malacocarpus* observed were uninjured.

The largest genus of cacti, *Opuntia,* is little sought after by the average collector, so detailed data will not be given. Suffice it to say that this genus includes the hardiest of all cacti, some of

which can withstand temperatures of -30°F, and also some of the tenderest. In common with other genera, the condition of the plant is of the utmost importance in determining its frost resistance. With cacti in general, the older and more mature a plant is, the greater its resistance; also the more dormant it is. Unfortunately there is no satisfactory method of making plants go dormant under cultivation when you want them to. The withholding of water in the fall is often recommended, but in my experience this has little value. If the weather continues warm, the plant will do its best to grow, even though it shrivels from lack of moisture, and this kind of shriveling does not appreciably enhance its frost resistance. On the other hand, those cacti which normally grow in cold climates have the remarkable property of being able to lose moisture from their tissues on the approach of winter, even though the ground be soaking wet from rain. This concentrates their sap, lowering its freezing point, and also gives room within the tissues for the formation of ice crystals without damage. Good examples are *Opuntia opuntia* and various species of *Echinocereus*. In my garden there are standing side by side a plump *Echinocereus*, showing badly frozen spots, and a limp, shriveled one which is entirely uninjured.

Returning to *Opuntias; O. floccosa* comes from 15,000 feet elevation and should therefore be perfectly hardy; yet it shows slight frost injury. Probably in its native habitat it goes into a dormant state under steady dry cold, while local fluctuating conditions prevent it from doing so. Similarly, several of the small types belonging in the *Tephrocactus* series of *Opuntias* were found to be tender. On the other hand, some of the *Platyopuntias* from Columbia and other tropical countries proved resistant far beyond our expectations.

The genus *Trichocereus*, which has been considered quite hardy, was a disappointment. Here again, vigorous growth in the fall takes place in spite of anything we may try to do to discourage it. About half of the species observed as reasonably mature plants received more or less severe injury, and all seedlings up to two years were completely killed.

Stetsonia coryne, which is a very showy cactus, was uninjured as a mature plant, while plants up to 8 inches were injured and smaller ones completely killed.

A pleasant surprise was in store for those of us who admire the large, fast-growing *Cereus* group. In spite of fall growth, a number of species and hybrids proved entirely frost-resistant. Other species escaped with nominal injury, while still others, such as *C. pernambucensis, C. tetragonus, C. glaucus, C. caesius*, must be regarded as tender.

All species of *Cleistocactus* were killed, which is a pity, because these plants respond so well to garden conditions and bloom so freely. They had come through the previous winter uninjured, but when they did go, they went completely.

Nyctocereus serpentinus was killed where placed in exposed situations, although it survived with partial injury where it had slight protection.

An interesting sidelight on the cold weather was its use as a diagnostic agent. There had been some doubt in my mind as to the correct naming of a plant well distributed in collections as *Heliocereus schrankii*. This plant very closely resembles a *Hylocereus*. All species of *Hylocereus* have proved to be extremely tender, and since the plant in question got through without injury, there remains no doubt as to its being a *Heliocereus*, since the latter genus occurs at high altitudes and is considerably hardier. *Heliocereus speciosus*, by the way, came through the first frost uninjured in spite of the fact that it was in very active growth, but was completely killed by the second frost, showing forcibly the killing effect of long-continued cold. Another instance: a seedling originating with Mr. E. C. Hummel was described as *Echinopsis imperialis* Hort. Later some doubt arose in Mr. Hummel's mind as to whether this plant might be merely a short-spined variety of *E. bridgesii*. The frost proved the point for him, since *E. bridgesii* is tender, and *E. imperialis* is hardy.

The three following examples of frost resistance in plants coming from truly tropical regions were a great surprise. *Aporocactus conzattii* from Oaxaca was absolutely uninjured. It was grafted on a *Nyctocereus serpentinus* which had three other branches, and the tips of these were badly frozen back. Several species of *Harrisia* appeared to be fully as frost-resistant as the various species of *Eriocereus*. Britton and Rose include in their genus *Harrisia*, species native to Cuba and other Caribbean islands, but also species native to Argentina and adjacent countries. Other authors separate these plants, including the South American ones in the genus *Eriocereus* and retaining in *Harrisia* only the Carribbean ones. Since we have found a majority of Cuban plants to be decidedly tender, it was a surprise to find that a number of *Harrisias* were almost hardy, as much so as the average of the genus *Eriocereus* which comes from a much cooler habitat. This again may be considered of

some diagnostic value in showing the close relationship between the two genera. It may be said that mature specimens of nearly all the species of both genera withstood the freeze with not more than partial injury, though younger plants were killed.

The third example of unexpected hardiness occurs in *Selenicereus*. One would expect this genus to behave similarily to the uniformly tender *Hylocerieae* from the same tropical habitat, but such is by no means the case. In *Selenicereus*, we find a wide variation in resistance. Extremely tender species are *S. murrilii, S. hamatus, S. donkelaerii*, etc. A particular plant, not definitely identified, but probably *S. brevispinus, was entirely uninjured*, and *S. vagans, S. chlorocarpa, S. spinulosus*, and a plant which may be *S. coniflorus*, show no visible damage. Of course, all *Selenicereae* had the slight protection of a lath-house since they require partial shade and support for their vining forms as a necessary condition. *S. macdonaldiae*, growing beside these hardy species was completely killed.

Mature plants of *Oreocereus celsianus*, and *O. trollii*, proved hardy, though younger plants were killed. Other species of *Oreocereus* were too young for observation, but will doubtless prove hardy also.

All species of *Haageocereus* must be regarded as decidedly tender.

Regarding *Mammillaria*, my data is very incomplete. Judging by some of those plants which were exposed, it is probable that a major portion of this genus must be regarded as tender.

M. compressa, M. geminispina, M. mystax, M. carnea, M. comptotricha, were killed, along with all *Mammilarias* from Lower California. Incidentally, it may be said that the entire cactus and succulent population of Lower California must be regarded as tender, according to my observations.

In *Echinocereus*, an extremely wide variation is noted, ranging from extremely hardy plants such as *E. chloranthus* to extremely tender ones such as *E. pensillus*, and that here the hardiness of the species follows very closely what might be expected from the climate prevailing in their natural habitats. The list of *Echinocereii* under observation is a long one and there is not space to go into detail; suffice it to say that the division into frozen or partially frozen and unfrozen species was about 50-50.

It is a frequent cause of regret to our cactus intelligentsia that the large and splendid genera *Lemaireocereus, Pilocereus*, and *Cephalocereus* are not available for outdoor cultivation, but it must be admitted that such is the case. Naturally we can not afford to be without some of these plants and a number of them can be grown out-of-doors in mild winters, particularly if given slight protection, but we cannot truthfully claim that a single one of them is hardy. Those approaching nearest to hardiness are the following: *Cephalocereus senilis, Pilocereus palmeri, P. euphorbioides, Lemaireocereus chichipe, L. pruinosus, L. weberi, L. stellatus.*

Regarding *Coryphantha*, my observations are limited. As a group they are apparently considerably hardier than *Mammillarias*, and a number of species appear to be entirely hardy for local conditions.

Ferocactus and *Echinocactus*, like the *Echinocereus*, follow closely their native habitats as to hardiness, which means that those species native to the United States are hardy here while those native in Lower California and some warmer parts of Mexico are distinctly tender. Particularly tender are *Ferocactus robustus* and *Ferocactus melocactiformis*. The species native to the United States were hardy.

The genus *Epiphyllum* shows a considerable range of hardiness depending on whether they are species or hybrids. The species are all quite tender, with the exception of *E. crenatum*, which is moderately hardy. The magnificent flowering hybrids which are so widely cultivated are for the most part derived from *E. crenatum* crossed with *Heliocereus speciosus* which is even hardier, or are hybrids derived from *Nopalxochia*, also a hardy plant. For this reason the hybrids are very much hardier than the species. While no unprotected *Epiphyllum* could have withstood the amount of cold we had in my immediate location, the hybrids will come through a moderate winter with only the protection of a lath-house, which they must have anyway for their proper growth.

SUCCULENTS

Among succulents other than cacti, the outstanding group for frost resistance is the *Mesembryanthema*. We already knew this from reports which reached us when there was a severe freeze in the San Francisco region several years ago, but it was forcibly brought home by recent experience. When you, one day, observe small plants of normally rather soft and flabby texture frozen stiff and solid, each leaf a block of ice, and then, a few days later, see them covered with brilliant and perfect flowers, you cannot help admiring their pluck. For years it has been a surprise to me that these plants are not more sought after. Small, compact, ideally suited to our local conditions of summer drought and

winter rains; strangely immune to insect attacks, showing almost infinite variety of plant forms and the most brilliant and abundant flowers of any group of succulents, and requiring litle except sunshine, they should be the ideal of every collector whose space is limited. The smaller types proved, on the whole, even hardier than the shrubby types. Whole genera of the former were uninjured, while several of the large shrubby species suffered injury. It may be said, in brief, that a majority of the small types of *Mesembryanthema* are hardy. Note the following exceptions: *Lithops* and *Conophytum* are on the edge and there was considerable loss here. Distinctly tender are *Juttadinteria* and *Machaerophyllum. Gibbeanum* species are all somewhat tender, also *Perisolobus. Cephalophyllum* shows a distinct range in hardiness, *C. spongiosum* being quite tender and *C. alstonii* somewhat so, while *C. acutum* is hardy.

Among succulents belonging to the lily family, a peculiar condition is encountered. Among cacti and most other plants, the first attack of frost is upon the tender growing tips. Among the Lilacious succulents the youngest parts have the greatest frost resistance and it is the old leaves which are injured. This does not, however, apply to flowers, which are even more susceptible to freezing.

I happen to have a very large collection of *Aloes,* and since these were all without protection, the damage was heavy in this section. Those which escaped entirely can be briefly listed: *A. aristata* (a rare plant which has never before looked so well or handsome. Try putting yours in a refrigerator. It is native in a fairly warm and moist habitat.) *A. variegata, A. ausana, A. striatula.* This completes the list of wholly uninjured species, but the following showed relative hardiness: *A. caesia, A. obscura, A. brevifolia, A. longistyla, A humilis.* In spite of moderate to heavy leaf injury in the other species, the plants were not killed and will eventually grow back into good shape. The following species are tender even in moderate winters: *A. plicatilis, A. cameronii, A. bainesii, A. tenuior, A. confusa, A. dicchotoma.*

The average hardiness of the genera *Gasteria* and *Haworthia* is approximately the same as that of *Aloes,* and since these partial-shade-loving plants are normally grown under some protection, they come through an average winter uninjured. This year, however, there was heavy injury, particularly among the *Haworthias,* some of which are more tender than others.

In the very large family *Crassulaceae,* there is an enormous range of frost resistance. The *Sempervivums,* as is well-known, come from cold countries, and are perfectly hardy almost anywhere. The related *Aeoniums* range from slightly hardy to very tender. The hardiest under observation here was *Aeonium tournfortii,* which was uninjured in an exposed situation. The majority of *Sedums* are hardy, but there are exceptions among the Mexican species, particularly the popular species *S. adolphi* with its peculiar yellow color, which is decidedly tender.

Echeverias, too, show a wide range. The so-called cabbage types are tender, as are also *E. linguifolia* and, to a large extent, *E. pulvinata* and *E. leucotricha,* while the following proved entirely hardy here: *E. amoena, E. microcalyx, E. expatriata, E. elegans* (horticulturally so-called; actually a hybrid). Other *Echeverias* showed intermediate degrees of hardiness, *E. setosa,* for instance, being almost hardy.

Perhaps the tenderest group of succulents we ordinarily attempt to cultivate is that comprising *Kalanchoe, Bryophyllum,* and *Katingia.* These are always the first to go, if given the slightest excuse. Next in tenderness comes the genus *Crassula,* although surprisingly enough, there are many remarkably hardy *Crassulas* and that, too, among the choicer and more compact plants such as *C. archeri, C. teres, C. rhombifolia, C. hemispherica,* etc.

The *Stapelia* group of succulents is extremely difficult in its growing requirements; perhaps the most difficult of any group we attempt. This is due to the fact that these plants require an extremely arid condition in winter, preferably with strong sunlight at the same time. Under such ideal conditions, many of them will stand considerable cold, but such conditions do not prevail out-of-doors in places where they are cultivated. My own practice is to take up all of them on the approach of winter and keep them under cover; hence none were exposed to freezing. But from previous experience I know that they would all have been killed had they been exposed, either by the cold directly or by the combination of cold and moisture.

To those whose acquaintance of *Agaves* is limited to association with the ubiquitious *A. americana,* it may be a surprise to know that more than half the species are really tender. In fact the large size of most species, combined with this tenderness, makes it impractical to assemble anything like a complete collection, even in Southern California. All species from Cuba and that vicinity, those from Lower California, and many species from other parts of Mexico, are more or less tender. The hardy ones are

chiefly the large types from the Mexican highlands, such as the *ferox* group and the so-called Pulque Agaves and those from the mountains of Arizona and California.

Yuccas, while not strictly included in the group of succulent plants, should be welcomed by collectors because the whole genus appears to be hardy far beyond one's natural expectation, since a number of them originate in warm climates, and the same is true of the related genus, *Dasylirion.*

I have made a complete list of all the plants which I had under observation, and shall be glad to answer inquiries regarding the hardiness of any particular species which has not been mentioned here owing to lack of space.

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Compton, Calif.

APPENDIX

The following is a list of plants recommended for open planting in California and for experimental planting in other places where the temperature does not go below 20°F. Only those plants are included which have horticultural merit and are not particularly difficult to grow. Bear in mind that this list refers to mature, established plants.

CACTI

Acanthocalycium (Echinopsis).
formosum.
spiniflorum.
violaceum.
Aporocactus conzattii, and probably other species.
Give partial shade.
Areocarpus fissuratus.
Astrophytum myriostigma.
Cereus (Piptanthocereus).
alacriportanus.
aethiops.
azureus.
stenogonus.
validus.
Chamaecereus silvestrii.
Coryphantha.
aggregata.
difficilis.
macromeris.
macrothele.
nichelsae.
scolymoides.
(and other species not under observation).
Echinocactus.
grusonii.
horizonthalonius.
ingens.
Echinocereus.
coccineus.
chloranthus.
conglomeratus.
dasyacanthus.
fendleri.
melanocentrus.
octacanthus.
reichenbachii.
rosei.
sarissophorus.
triglochidiatus.
Echinomastus.
macdowellii.
Echinopsis.
All species and hybrids *except* the following:
bridgesii.
misleyi.
huottii.
calochlora.
Eriosyce korrethroides.
Escobaria.
chaffeyi.
sneedii.
tuberculosa.
Ferocactus.
acanthodes.
covillei.
latispinus.
macrodiscus.
uncinatus.
wislizeni.
Gymnocalycium lafaldense.
(and perhaps other species not under observation).
Hamatocactus setispinus.
Lobivia.
Most species. Not enough mature plants were under observation to make a detailed report.
Lophophora williamsii.
Malacocarpus vorwerkianus.
(Other species not observed are probably equally hardy.)
Mamillaria.
applanata.
heyderi.
microcarpa.
(And undoubtedly a number of other species not under observation.)
Notocactus.
apricus.
concinnus.
leninghausii.
mammulosus.
ottonis.
pampeanus.
scopa.
submammulosus.
tabularis.
(Other species are probably equally hardy.)
Opuntia.
aurantiaca.
basilaris, and its varieties.
clavarioides cristata.
erectoclada.
erinacea.
fragilis.
grandiflora.
macrocentra.
microdasys.
microsphaerica.
moelleri.
prolifera.
rhodantha.
schottii.
silvestrii.
soehrensii.

Opuntia—continued
spinosior.
stenopetala.
teres.
tracyi.
vaseyi.
verschaffeltii.
vestita.
weberi.
(And many others.)
Oreocereus.
celsianus.
trollii.
Pyrrhocactus strausianus.
(And probably other species which were not under observation.)
Rebutia.
A number of species under observations were all hardy.
Selenicereus.
brevispinus (plant under observation may possibly have been a hybrid).
chlorocarpa.
spinulosus.
vagans.
Stenocactus.
multicostatus (the only mature plant under observation. Doubtless other species are as hardy.)
Stetsonia coryne.
Thelocactus.
nidulans.
rinconensis.
Trichocereus.
auricolor.
bertramianus.
candicans.
lamprochlorus.
pasacana.
poco.
schickendantzii.
shaferi.
terscheckii.

SUCCULENTS

Aeonium tournfortii.
Agave.
albicans.
americana.
atrovirens.
ferox.
filifera.
huachucensis.
ingens.
lophantha.
mitriformis.
palmeri.
parryi.
parviflora.
striata.
stricta.
schottii.
treleasei.
verschaffeltii.
victoria reginae. (Keep dry in winter.)
Aloe.
aristata.
ausana.
caesia.
humilis.
longistyla.
obscura.
salm-dyckiana.
striatula.
variegata.
(Many other species which may suffer leaf injury but not be killed may safely be planted.)
Bulbine caulescens.
Cotyledon.
orbiculata.
wallachii.
(And various other species and hybrids.)
Crassula.
corallina.
purcellii.
rhombifolia.
tetragona.
Dasylirion.
All Species.
Dudleya.
All species from California. Those from Lower California are somewhat tender.
Dyckia variflora.
Echeveria.
amoena.
"elegans."
expatriata.
galuca. Hyb.
lozani.
microcalyx.
stolonifera.
Euphorbia.
caput commelina.
caputmedusae major.
caputmedusae minor.
inermis.
meloformis.
obesa.
pugniformis.
valida.
Nolina parryi.
Mesembrianthema.
Argeta petrensis.
Aridaria—most species.
Carpobrotus aequilateralis.
Cheiridopsis—nearly all species.
Conicosa punioniformis.
Delosperma brunnthaleri and some other species.
Drosanthemum—most species.
Faucaria—all species.
Hereroa—all species.
Hymenocyclus—all species.
Lithops lesliei, pseudotruncatella.
Mesembrianthemum aureum, odoratum.
Nananthus—all species.
Odontophorus nanus.
Pleiospilos bolusii.
nellii.
simulans.
Punctillaria magnipunctata.
nobilis.
Rabia—all species.
Ruschia—all species.
Stomatium—all species except *S. comptonii.*
Titanopsis—all species.
Triachodiadema—all species.
Verrucaria schwantezii.
Pachyphytum.
compactum.
glutinosum.
hookeri.
uniflorum.
Sedum.
acre.

altissimum.
dasyphyllum.
guatamalense.
moranense.
multiceps.
pachyphyllum.
winkleri.
(And a majority of other species.)
Sempervivum—all species.
Sinocrassula species.
Umbillicus chrysanthus.
Yucca—all species.

PRESIDENT'S MESSAGE

Dr. Forrest Shreve, of the Carnegie Desert Laboratory, Tucson, Ariz., brought a wealth of information well illuminated by fine views of various deserts and their floras, to the joint meeting with our Long Beach Affiliates on Feb. 12th. We cannot express our appreciation too strongly.

Dr. Shreve remained a few days and together with Dr. Ira Wiggins of Stanford University, attended the meeting of the Cactus Nomenclature and Revision Committee at the Huntington Botanical Gardens on the 14th. Prior to the meeting, Mr. Hertrich entertained the Committee with luncheon.

The Executive Board has forwarded a resolution to the U. S. Dept. of Agriculture, requesting the establishment of a port of entry for foreign plant material at Los Angeles Harbor, (San Pedro), Calif.

The application for affiliation of the Arizona Cactus & Native Flora Society has been approved and they are now active participants in our cause. We welcome them and hope our association will bring mutual pleasure and profit. Remember they are expecting a host of us to visit with them on the Memorial Day week-end. Information sheets regarding the tour may be obtained by addressing a card to me.

Negotiations are under way through which it is expected our Annual Show for this year will be conducted as a part of the great Los Angeles County Fair at Pomona, Sept. 17th to Oct. 3rd.

Two notable exploration trips resulting in new discoveries and the collection of rare species have just been made. F. Radley, Oakland, Calif., visited all the islands off the Gulf of California, Mexico. Ted Hutchison, one of our past secretaries, Azusa, Calif., spent several months in little known portions of south eastern Mexico.

There will be no Society meeting in March. Our next meeting will probably be a garden tour with our affiliates in Riverside in April.

HOWARD E. GATES, Anaheim, Calif.

CACTI VS. FLOODS

I have discovered a new treatment for Cacti. First you set the plants at the bottom of the Ohio River for a week. Then you leave them in a dark basement for three more weeks. Then you look at them, and may be surprised to find how many are still living. The plants are still in a friend's basement because my house was ruined by the recent flood, but they have enough heat to keep them from freezing, so I do not think that I will lose any more.

When the rising water put out my furnace fire on Jan. 23rd, I moved my plants to a neighbor's house one block higher up the hill. At that time no one supposed that the water would even reach the floor of my house, and we thought my friend's basement was safe against the highest flood; but the water started rising fast once more about noon of the 24th. I worked hard all afternoon getting my furniture to the second floor, and only lost a davenport, a kitchen cabinet, and an ice box which we could not get upstairs. The water was coming in my front door as I left. The water was 56½ inches deep in my house. Of 10,000 people in Dayton 3,200 were flood refugees. Many houses were destroyed completely. That night it came into my friend's basement where I had stored my cacti, and put out his fire and covered the plants for a week. Then for a week they remained there without any heat, but for the past two weeks they have had heat, and have dried out fairly well.

Out of 135 varieties I lost 16 plants.

This is really not such a bad proportion considering the treatment the plants have received. Strange as it may seem, an *Astrophytum asterias,* an *Ariocarpus fissuratus,* and three *Homalocephala texensis* lived through the flood. I lost the following plants: *Frailea grahlianus; Wilcoxia* (grafted), both the stock and the graft; *Ferocactus crassihamatus; Pereskia pereskia; Astrophytum myriostigma; Lemaireocereus thurberi; Mamillaria brandegeii; Heliocereus speciosus; Pereskiopsis porteri; Hylocereus undatus; Zygocactus truncatus; Frailea pumilis; Opuntia basilaris; Nopalea cochinilifera; Epiphyllum oxypetalum; Schlumbergeria gaertneri* (grafted). I lost only the graft, and not the stock.

NEIL E. ANNABLE, *Kentucky.*

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Figure 1

The Rockery in Johannesburg

By R. A. DYER

It occurred to me that some of your readers might be interesting in the succulents which have been staged in Johannesburg, South Africa, for the British Empire Exhibition which is being held from the 15th of September to the 15th of January, 1937. The Exhibition is primarily for the advertisement of commerce, and succulents are included in the layout of the grounds to give a typical South African setting. The accompanying photographs give some idea of the magnitude of the rockery devoted entirely to the indigenous flora.

Not many months ago the rockery shown in Fig. 1 was a dusty bank and by the time the Exhibition opens it is anticipated that the *Mesembryanthemums* which can be seen growing over the rocks will be a riot of color. They are mostly of the free flowering kinds which are perhaps not so keenly sought after by overseas collectors as the dwarf species of very specialized structure. The white flowering bush in the center is a "daisy," *Dimorphotheca ecklonis*. In the center foreground a small species of *Aloe* can be seen in flower, and the larger very prickly one on the left is a baby *A. marlothii*. A larger specimen of this species is at the back of the man on the skyline. Other species of this genus in the picture are *A. niteus, A. candilabra,* and *A. ferox*. The "tree-fern" like plants with a stout trunk and tuft of long pinnate leaves from the top, are species of the primitive genus *Encephalartos*.

In Fig. 2 one sees a small portion of the rockery devoted to dwarf succulents. Slightly to the left of the center foreground is a cushion-shaped mass of *Euphorbia pulvinata* and to the left behind it is *E. restituta,* and to the right a *Gibbaeum* sp. A *Stapelia* is in the right foreground. The *Aloe* in the center with a nude stem is a baby *A. dichotoma* from the desert area of Namaqualand. What is possibly a young *A. marlothii* is prominent on the left and the smaller spinless *A. striata* is on the right. Taking nearly central position in Fig. 3 is a group of three plants of *A. polyphylla,* one of the rarest and in its native habitat one of the most inaccessible plants in the region. Note the regular, spirally twisted leaves and the perfectly symmetrical shape of the plant as a whole. It brought

Figure 2

Figure 3

back to Jim pleasant memories of his far away home among the mountains.

The task of naming this vast collection is being taken in hand at the present time and visitors will thus have the opportunity of appreciating more fully some of the wonders of the South African Flora at this Empire Exhibition to which all are cordially invited.

EDITOR'S NOTE: An interesting series of articles are now ready for publication in the JOURNAL. Readers will wecome this first hand information from our friends in South Africa regarding their wealth of succulents.

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